

## SEQUENCE LISTING

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10 <120> Resistant plants and uses thereof

<130> AE 20030596

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65 caa gag gtt gag aat ctg ctt caa cca att ttg gat gat gat ggc aaa 288

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## 12

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Glu Ser Leu Lys Leu Lys Leu Thr Phe Ile Cys Thr Tyr Val Gln Leu  
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Ser Tyr Ser Asp Leu Glu Lys Phe Glu Asp Ile Met Thr Arg Lys Arg  
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Gln Glu Val Glu Asn Leu Leu Gln Pro Ile Leu Asp Asp Asp Gly Lys  
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Cys Cys Ile Lys His Glu Met Val Glu Asn Val Leu Ser Leu Phe Gln  
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Thr Glu Leu Glu Val Met His Ile Cys Tyr Lys Thr Leu Lys Ala Ser

## 15

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## 17

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 The initiation codon (ATG position 1546-1548) and the termination  
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## 20

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## 22

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## 23

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40 <210> 6  
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 45 <213> Solanum bulbocastanum

50 <220>  
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 <222> (1)..(9949)  
 55 <223> Sequence of 9949 bp Sau3AI genomic DNA fragment of S. bulbocastanum 2002 BAC BlbSP39 present in pSP39-20. The genomic fragment harbours the Rpi-blb2 gene including natural elements necessary for expression. Initiation codon (ATG position 1413-1415), the termination codon (TAG position 5300-5303)

60  
 65 <220>  
 <221> start\_codon  
 <222> (1413)..(1415)

5 <223> Sequence of 9949 bp Sau3AI genomic DNA fragment of *S. bulbocastan*  
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 expression. Initiation codon (ATG position 1413-1415), the termi  
 nation codon (TAG position 5300-5303)

10 <220>  
 <221> stop\_codon  
 <222> (5300)..(5303)

15 <223> Sequence of 9949 bp Sau3AI genomic DNA fragment of *S. bulbocastan*  
 um 2002 BAC BlbSP39 present in pSP39-20. The genomic fragment har  
 bours the Rpi-blb2 gene including natural elements necessary for  
 expression. Initiation codon (ATG position 1413-1415), the termi  
 20 nation codon (TAG position 5300-5303)

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## 25

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 20 agttgtgtga ttattcaaaa agttttaata acgaaaatcc acatgcttga attaattgaa 8040  
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 40 ataaaaagta tcagagttct acatataaag agtaacaatt gaaataatta attaaatatg 8640  
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 65 ctctgtactt tgattctgca ctagatcaag atacaacatt ttgcttttta ctctccatg 9420  
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## 29

	atccagccca atcgacatct gcaaaacact caatatgagt atggctcgtga ttttgatact	9540
	atattccaag actaggagtt ttcttcaagt aacatagaat atgttccaaa gctgcccagt	9600
5	gtttgacgta ggtgcaaaca tgaactagct aacaacactt actgcaaaag caatatcaag	9660
	atgagtcaca ataaggtagt ttaactttcc aactaacctt ttgtatctct atggatcatt	9720
	aaaaggatcg tcgtcatctt tcataagatg catattggga accattggag aacttcaggg	9780
10	tttggtgcc atctttcaat tttctgcaag tagatcgaga gaatatattc tctaagacaa	9840
	aagaattccc tttttgttcc tatttacttc tactcccaaa atgtatttca attgacccaa	9900
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	1 5 10 15	
45	ttt tct gct ctt agc aag gac att gcc gat gtt ctg gtt ttc cta gag Phe Ser Ala Leu Ser Lys Asp Ile Ala Asp Val Leu Val Phe Leu Glu	96
	20 25 30	
50	aat gag gaa aat caa aaa gct ctt gac aaa gat caa gtt gaa aag ata Asn Glu Glu Asn Gln Lys Ala Leu Asp Lys Asp Gln Val Glu Lys Ile	144
	35 40 45	
55	aaa ttg aaa atg gca ttt att tgt aca tat gtt cag ctt tct tgt tcc Lys Leu Lys Met Ala Phe Ile Cys Thr Tyr Val Gln Leu Ser Cys Ser	192
	50 55 60	
60	gat ttt gag cag ttt gaa gat ata atg act aga aaa aga caa gag gtt Asp Phe Glu Gln Phe Glu Asp Ile Met Thr Arg Lys Arg Gln Glu Val	240
	65 70 75 80	
65	gag aat ctg ctt caa cca ctt ttg gat gat gat gtc ttt act agc ctc Glu Asn Leu Leu Gln Pro Leu Leu Asp Asp Val Phe Thr Ser Leu	288
	85 90 95	
65	acc agt aat atg gat gac tgt atc agc ttg tat cat cgt tct tat aaa Thr Ser Asn Met Asp Asp Cys Ile Ser Leu Tyr His Arg Ser Tyr Lys	336
	100 105 110	
	tca gat gcc atc atg atg gat gag caa ttg gac ttc ctc ctc ttg aat Ser Asp Ala Ile Met Met Asp Glu Gln Leu Asp Phe Leu Leu Leu Asn	384

## 30

	115	120	125	
5	ctc tat cat cta tcc aag cat cac gct gaa aag ata ttt cct gga gtg Leu Tyr His Leu Ser Lys His His Ala Glu Lys Ile Phe Pro Gly Val 130 135 140	432		
10	act caa tat gaa gtt ctt cag aat ata tgt ggc aac ata aga gat ttc Thr Gln Tyr Glu Val Leu Gln Asn Ile Cys Gly Asn Ile Arg Asp Phe 145 150 155 160	480		
15	cat ggg ttg ata gtg aat ggt tgc att aag cat gag atg gtt gag aat His Gly Leu Ile Val Asn Gly Cys Ile Lys His Glu Met Val Glu Asn 165 170 175	528		
20	gtc ttr cct ctg ttt caa ctc atg gct gac aga gta gga cac ttc ctt Val Xaa Pro Leu Phe Gln Leu Met Ala Asp Arg Val Gly His Phe Leu 180 185 190	576		
25	tgg gat gat cag act gat gaa gac tct cga ctc tcc gag cta gat gag Trp Asp Asp Gln Thr Asp Glu Asp Ser Arg Leu Ser Glu Leu Asp Glu 195 200 205	624		
30	gat gaa caa aat gat aga gac tct cga ctt ttc aag cta gca cat cta Asp Glu Gln Asn Asp Arg Asp Ser Arg Leu Phe Lys Leu Ala His Leu 210 215 220	672		
35	ctc ttg aag atc gtt ccg gtt gaa ctg gag gtt ata cac ata tgt tat Leu Leu Lys Ile Val Pro Val Glu Leu Glu Val Ile His Ile Cys Tyr 225 230 235 240	720		
40	aca aac ttg aaa gct tca act tca gct gaa gtt gga ctc ttc att aag Thr Asn Leu Lys Ala Ser Thr Ser Ala Glu Val Gly Leu Phe Ile Lys 245 250 255	768		
45	cag ctt cta gaa acc tct cca gat att ctg agg gaa tat cta att cct Gln Leu Leu Glu Thr Ser Pro Asp Ile Leu Arg Glu Tyr Leu Ile Pro 260 265 270	816		
50	ctg caa gag cac atg gta act gtt att acc cct agc act tca ggg gct Leu Gln Glu His Met Val Thr Val Ile Thr Pro Ser Thr Ser Gly Ala 275 280 285	864		
55	cga aac att cat gtc atg atg gaa ttc cta tta ctt att ctt tct gat Arg Asn Ile His Val Met Met Glu Phe Leu Leu Ile Leu Ser Asp 290 295 300	912		
60	atg ccc aag gac ttt att cat cat gac aaa ctt ttt gat ctc ttg gat Met Pro Lys Asp Phe Ile His His Asp Lys Leu Phe Asp Leu Leu Asp 305 310 315 320	960		
65	cgt gtc gga gta ctt acc agg gag gta tca act ctt gta cgt gac ttg Arg Val Gly Val Leu Thr Arg Glu Val Ser Thr Leu Val Arg Asp Leu 325 330 335	1008		
70	gaa gag gaa cca agg aat aaa gag ggt aat aac caa aca aat tgt gca Glu Glu Glu Pro Arg Asn Lys Glu Gly Asn Asn Gln Thr Asn Cys Ala 340 345 350	1056		
75	acc cta gac ttg ctg gaa aat att gaa ctc ctc aag aaa gat ctc aaa Thr Leu Asp Leu Leu Glu Asn Ile Glu Leu Leu Lys Lys Asp Leu Lys 355 360 365	1104		
80	cat gtt tat ctg aaa gcc ctg gat tca tct caa tgt tgc ttc ccc atg His Val Tyr Leu Lys Ala Leu Asp Ser Ser Gln Cys Cys Phe Pro Met 370 375 380	1152		
85	agt gat gga cca ctc ttc atg cat ctt cta cac ata cac tta aat gat Ser Asp Gly Pro Leu Phe Met His Leu Leu His Ile His Leu Asn Asp 385 390 395	1200		

## 31

	385	390	395	400	
5	ttg tta gat tct aat gct tat tca att gct ttg ata aag gaa gaa atc Leu Leu Asp Ser Asn Ala Tyr Ser Ile Ala Leu Ile Lys Glu Glu Ile	405	410	415	1248
10	gag ctg gtg aag caa gac ctg aaa ttc ata aga tca ttc ttt gtg gat Glu Leu Val Lys Gln Asp Leu Lys Phe Ile Arg Ser Phe Phe Val Asp	420	425	430	1296
15	gct gag caa gga ttg tat aaa gat ctc tgg gca cgt gtt cta gat gtg Ala Glu Gln Gly Leu Tyr Lys Asp Leu Trp Ala Arg Val Leu Asp Val	435	440	445	1344
20	gct tat gag gca aaa gat gtc ata gat tca att att gtt cga gat aat Ala Tyr Glu Ala Lys Asp Val Ile Asp Ser Ile Ile Val Arg Asp Asn	450	455	460	1392
25	ggt ctc tta cat ctt att ttc tca ctt ccc att acc ata aag aag atc Gly Leu Leu His Leu Ile Phe Ser Leu Pro Ile Thr Ile Lys Lys Ile	465	470	475	1440
30	aaa ctt atc aaa gaa gag atc tct gct tta gat gag aac att ccc aag Lys Leu Ile Lys Glu Glu Ile Ser Ala Leu Asp Glu Asn Ile Pro Lys	485	490	495	1488
35	gac aga ggt cta atc gtt gtg aac tct ccc aag aaa cca gtt gag aga Asp Arg Gly Leu Ile Val Val Asn Ser Pro Lys Lys Pro Val Glu Arg	500	505	510	1536
40	aag tca ttg aca act gat aaa ata act gta ggt ttt gag gag gaa aca Lys Ser Leu Thr Thr Asp Lys Ile Thr Val Gly Phe Glu Glu Glu Thr	515	520	525	1584
45	aac ttg ata ctt aga aag ctc acc agt gga tgc gca gat cta gat gtc Asn Leu Ile Leu Arg Lys Leu Thr Ser Gly Ser Ala Asp Leu Asp Val	530	535	540	1632
50	att tgc atc act ggt atg ccg ggt tca ggt aaa act act ttg gca tac Ile Ser Ile Thr Gly Met Pro Gly Ser Gly Lys Thr Thr Leu Ala Tyr	545	550	555	1680
55	aaa gta tac aat gat aag tca gtt tct agc cgt ttc gac ctt cgt gca Lys Val Tyr Asn Asp Lys Ser Val Ser Ser Arg Phe Asp Leu Arg Ala	565	570	575	1728
60	tgg tgc acg gtc gac caa gga tgt gat gag aag aag ttg ttg aat aca Trp Cys Thr Val Asp Gln Gly Cys Asp Glu Lys Lys Leu Leu Asn Thr	580	585	590	1776
65	att ttc agt caa gtt agt gac tca gat tca aaa ttg agt gag aat att Ile Phe Ser Gln Val Ser Asp Ser Asp Ser Lys Leu Ser Glu Asn Ile	595	600	605	1824
70	gat gtt gct gat aaa tta cgg aaa caa ctg ttt gga aag agg tat ctt Asp Val Ala Asp Lys Leu Arg Lys Gln Leu Phe Gly Lys Arg Tyr Leu	610	615	620	1872
75	att gtc tta gat gac gtg tgg gat act act aca tgg gat gag tta aca Ile Val Leu Asp Asp Val Trp Asp Thr Thr Thr Trp Asp Glu Leu Thr	625	630	635	1920
80	aga cct ttt cct gaa tct aag aaa gga agt agg att att ttg aca act Arg Pro Phe Pro Glu Ser Lys Lys Gly Ser Arg Ile Ile Leu Thr Thr	645	650	655	1968
85	cgg gaa aag gaa gtg gct ttg cat gga aag ctg aac act gat cct ctt Arg Glu Lys Glu Val Ala Leu His Gly Lys Leu Asn Thr Asp Pro Leu				2016

	660	665	670	
5	gac ctt cga ttg cta aga cca gat gaa agt tgg gaa cta tta gag aaa Asp Leu Arg Leu Leu Arg Pro Asp Glu Ser Trp Glu Leu Leu Glu Lys 675 680 685	2064		
10	agg gca ttt ggg aat gag agt tgc cct gat gaa cta tta gat gtc ggt Arg Ala Phe Gly Asn Glu Ser Cys Pro Asp Glu Leu Leu Asp Val Gly 690 695 700	2112		
15	aaa gaa ata gcc gaa aat tgt aaa ggg ctt cct ttg gtg gct gat ctg Lys Glu Ile Ala Glu Asn Cys Lys Gly Leu Pro Leu Val Ala Asp Leu 705 710 715 720	2160		
20	att gct gga gtc att gct ggg agg gaa aag aaa agg agt gtg tgg ctt Ile Ala Gly Val Ile Ala Gly Arg Glu Lys Lys Arg Ser Val Trp Leu 725 730 735	2208		
25	gaa gtt caa agt agt ttg agt tct ttt att ttg aac agt gaa gtg gaa Glu Val Gln Ser Ser Leu Ser Ser Phe Ile Leu Asn Ser Glu Val Glu 740 745 750	2256		
30	gtg atg aaa gtt ata gaa tta agt tat gac cat tta cca cat cac ctc Val Met Lys Val Ile Glu Leu Ser Tyr Asp His Leu Pro His His Leu 755 760 765	2304		
35	aag cca tgc ttg ctg tat ttt gca agt ttt ccg aag gac act tca ttg Lys Pro Cys Leu Leu Tyr Phe Ala Ser Phe Pro Lys Asp Thr Ser Leu 770 775 780	2352		
40	aca atc tat gag ttg aat gtt tat ttc ggt gct gaa gga ttt gtg gga Thr Ile Tyr Glu Leu Asn Val Tyr Phe Gly Ala Glu Gly Phe Val Gly 785 790 795 800	2400		
45	aag acg gag atg aac agt atg gaa gaa gtg gtg aag att tat atg gat Lys Thr Glu Met Asn Ser Met Glu Glu Val Val Lys Ile Tyr Met Asp 805 810 815	2448		
50	gat tta att tac agt agc ttg gta att tgt ttc aat gag ata ggt tat Asp Leu Ile Tyr Ser Ser Leu Val Ile Cys Phe Asn Glu Ile Gly Tyr 820 825 830	2496		
55	gca ctg aat ttc caa att cat gat ctt gtg cat gac ttt tgt ttg ata Ala Leu Asn Phe Gln Ile His Asp Leu Val His Asp Phe Cys Leu Ile 835 840 845	2544		
60	aaa gca aga aag gaa aat ttg ttt gat cag ata aga tca agt gct cca Lys Ala Arg Lys Glu Asn Leu Phe Asp Gln Ile Arg Ser Ser Ala Pro 850 855 860	2592		
65	tca gat ttg ttg cct cgt caa att acc att gat tgt gat gag gag gag Ser Asp Leu Leu Pro Arg Gln Ile Thr Ile Asp Cys Asp Glu Glu Glu 865 870 875 880	2640		
70	cac ttt ggg ctt aat ttt gtc atg ttc gat tca aat aag aaa agg cat His Phe Gly Leu Asn Phe Val Met Phe Asp Ser Asn Lys Lys Arg His 885 890 895	2688		
75	tct ggt aaa cac ctc tat tct ttg agg ata att gga gac cag ctg gat Ser Gly Lys His Leu Tyr Ser Leu Arg Ile Ile Gly Asp Gln Leu Asp 900 905 910	2736		
80	gac agt gtt tct gat gca ttt cac cta aga cac ttg agg ctt ctt aga Asp Ser Val Ser Asp Ala Phe His Leu Arg His Leu Arg Leu Leu Arg 915 920 925	2784		
85	gtg ttg gac ctg cat acg tct ttt atc atg gtg aaa gat tct ttg ctg Val Leu Asp Leu His Thr Ser Phe Ile Met Val Lys Asp Ser Leu Leu 2832			

## 33

	930	935	940	
5	aat gaa ata tgc atg ttg aat cat ttg agg tac tta tcc att gac aca Asn Glu Ile Cys Met Leu Asn His Leu Arg Tyr Leu Ser Ile Asp Thr 945 950 955 960	2880		
10	caa gtt aaa tat ctg cct ttg tct ttc tca aac ctc tgg aat cta gaa Gln Val Lys Tyr Leu Pro Leu Ser Phe Ser Asn Leu Trp Asn Leu Glu 965 970 975	2928		
15	agc ctg ttt gtg tct acc aac aga tca atc ttg gta cta tta ccg aga Ser Leu Phe Val Ser Thr Asn Arg Ser Ile Leu Val Leu Leu Pro Arg 980 985 990	2976		
20	att ttg gat ctt gta aag ttg cga gtg ctg tcc gtg gat gct tgt tct Ile Leu Asp Leu Val Lys Leu Arg Val Leu Ser Val Asp Ala Cys Ser 995 1000 1005	3024		
25	ttc ttt gat atg gat gca gat gaa tca ata ttg ata gca gag gac Phe Phe Asp Met Asp Ala Asp Glu Ser Ile Leu Ile Ala Glu Asp 1010 1015 1020	3069		
30	aca aag tta gag aac ttg aga ata tta acg gaa ctg ttg att tcc Thr Lys Leu Glu Asn Leu Arg Ile Leu Thr Glu Leu Leu Ile Ser 1025 1030 1035	3114		
35	tat tcg aaa gat aca aag aat att ttc aaa agg ttt ccc aat ctt Tyr Ser Lys Asp Thr Lys Asn Ile Phe Lys Arg Phe Pro Asn Leu 1040 1045 1050	3159		
40	cag ttg ctt tca ttt gaa ctc aag gag tca tgg gat tat tca aca Gln Leu Leu Ser Phe Glu Leu Lys Glu Ser Trp Asp Tyr Ser Thr 1055 1060 1065	3204		
45	gag caa cat tgg ttc tcg gaa ttg gat ttc cta act gaa cta gaa Glu Gln His Trp Phe Ser Glu Leu Asp Phe Leu Thr Glu Leu Glu 1070 1075 1080	3249		
50	aca ctc tct gta ggt ttt aaa agt tca aac aca aac gat agt ggg Thr Leu Ser Val Gly Phe Lys Ser Ser Asn Thr Asn Asp Ser Gly 1085 1090 1095	3294		
55	tcc tct gta gcg aca aat cgg ccg tgg gat ttt cac ttc cct tca Ser Ser Val Ala Thr Asn Arg Pro Trp Asp Phe His Phe Pro Ser 1100 1105 1110	3339		
60	aat ttg aaa ata ctg tgg ttg cgt gaa ttt ccg ctg aca tcc gat Asn Leu Lys Ile Leu Trp Leu Arg Glu Phe Pro Leu Thr Ser Asp 1115 1120 1125	3384		
65	tca cta tca aca ata gcg aga ctg ccc aac ctt gaa gag ttg tcc Ser Leu Ser Thr Ile Ala Arg Leu Pro Asn Leu Glu Glu Leu Ser 1130 1135 1140	3429		
70	ctt tat cat aca atc atc cat gga gaa gaa tgg aac atg ggg gag Leu Tyr His Thr Ile Ile His Gly Glu Glu Trp Asn Met Gly Glu 1145 1150 1155	3474		
75	gaa gac acc ttt gag aat ctc aaa ttt ttg aac ttc aat caa gtt Glu Asp Thr Phe Glu Asn Leu Lys Phe Leu Asn Phe Asn Gln Val 1160 1165 1170	3519		
80	agt att tcc aag tgg gag gtt gga gag gaa tcc ttc ccc aat ctt Ser Ile Ser Lys Trp Glu Val Gly Glu Glu Ser Phe Pro Asn Leu 1175 1180 1185	3564		
85	gag aaa tta aaa ctg cgg gga tgt cat aag cta gag gag att cca Glu Lys Leu Lys Leu Arg Gly Cys His Lys Leu Glu Glu Ile Pro 1190 1195 1200	3609		

## 34

	1190	1195	1200	
	cct agt ttt gga gat att tat tca ttg aaa tct atc aaa att gta			3654
	Pro Ser Phe Gly Asp Ile Tyr Ser Leu Lys Ser Ile Lys Ile Val			
5	1205	1210	1215	
	aag agt cct caa ctt gaa gat tct gct ctc aaa att aag gaa tac			3699
	Lys Ser Pro Gln Leu Glu Asp Ser Ala Leu Lys Ile Lys Glu Tyr			
	1220	1225	1230	
10				
	gct gaa gat atg agg gga ggg gac gag ctt cag atc ctt ggc caa			3744
	Ala Glu Asp Met Arg Gly Gly Asp Glu Leu Gln Ile Leu Gly Gln			
	1235	1240	1245	
15				
	aag aat atc ccc tta ttt aag tag			3768
	Lys Asn Ile Pro Leu Phe Lys			
	1250	1255		
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	<222> (178)..(178)			
35	<223> The 'Xaa' at location 178 stands for Leu.			
	<400> 8			
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45	Phe Ser Ala Leu Ser Lys Asp Ile Ala Asp Val Leu Val Phe Leu Glu			
	20 25 30			
50	Asn Glu Glu Asn Gln Lys Ala Leu Asp Lys Asp Gln Val Glu Lys Ile			
	35 40 45			
55	Lys Leu Lys Met Ala Phe Ile Cys Thr Tyr Val Gln Leu Ser Cys Ser			
	50 55 60			
60	Asp Phe Glu Gln Phe Glu Asp Ile Met Thr Arg Lys Arg Gln Glu Val			
	65 70 75 80			
65	Glu Asn Leu Leu Gln Pro Leu Leu Asp Asp Asp Val Phe Thr Ser Leu			
	85 90 95			
	Thr Ser Asn Met Asp Asp Cys Ile Ser Leu Tyr His Arg Ser Tyr Lys			
	100 105 110			
	Ser Asp Ala Ile Met Met Asp Glu Gln Leu Asp Phe Leu Leu Leu Asn			

## 35

	115	120	125
5	Leu Tyr His Leu Ser Lys His His Ala Glu Lys Ile Phe Pro Gly Val 130 135 140		
10	Thr Gln Tyr Glu Val Leu Gln Asn Ile Cys Gly Asn Ile Arg Asp Phe 145 150 155 160		
15	His Gly Leu Ile Val Asn Gly Cys Ile Lys His Glu Met Val Glu Asn 165 170 175		
20	Val Xaa Pro Leu Phe Gln Leu Met Ala Asp Arg Val Gly His Phe Leu 180 185 190		
25	Trp Asp Asp Gln Thr Asp Glu Asp Ser Arg Leu Ser Glu Leu Asp Glu 195 200 205		
30	Asp Glu Gln Asn Asp Arg Asp Ser Arg Leu Phe Lys Leu Ala His Leu 210 215 220		
35	Leu Leu Lys Ile Val Pro Val Glu Leu Glu Val Ile His Ile Cys Tyr 225 230 235 240		
40	Thr Asn Leu Lys Ala Ser Thr Ser Ala Glu Val Gly Leu Phe Ile Lys 245 250 255		
45	Gln Leu Leu Glu Thr Ser Pro Asp Ile Leu Arg Glu Tyr Leu Ile Pro 260 265 270		
50	Leu Gln Glu His Met Val Thr Val Ile Thr Pro Ser Thr Ser Gly Ala 275 280 285		
55	Arg Asn Ile His Val Met Met Glu Phe Leu Leu Leu Ile Leu Ser Asp 290 295 300		
60	Met Pro Lys Asp Phe Ile His His Asp Lys Leu Phe Asp Leu Leu Asp 305 310 315 320		
65	Arg Val Gly Val Leu Thr Arg Glu Val Ser Thr Leu Val Arg Asp Leu 325 330 335		
	Glu Glu Glu Pro Arg Asn Lys Glu Gly Asn Asn Gln Thr Asn Cys Ala 340 345 350		
	Thr Leu Asp Leu Leu Glu Asn Ile Glu Leu Leu Lys Lys Asp Leu Lys 355 360 365		
	His Val Tyr Leu Lys Ala Leu Asp Ser Ser Gln Cys Cys Phe Pro Met 370 375 380		
	Ser Asp Gly Pro Leu Phe Met His Leu Leu His Ile His Leu Asn Asp		

	385		390		395		400									
5	Leu	Leu	Asp	Ser	Asn	Ala	Tyr	Ser	Ile	Ala	Leu	Ile	Lys	Glu	Glu	Ile
					405					410					415	
10	Glu	Leu	Val	Lys	Gln	Asp	Leu	Lys	Phe	Ile	Arg	Ser	Phe	Phe	Val	Asp
				420					425					430		
15	Ala	Glu	Gln	Gly	Leu	Tyr	Lys	Asp	Leu	Trp	Ala	Arg	Val	Leu	Asp	Val
			435					440					445			
20	Ala	Tyr	Glu	Ala	Lys	Asp	Val	Ile	Asp	Ser	Ile	Ile	Val	Arg	Asp	Asn
			450				455					460				
25	Gly	Leu	Leu	His	Leu	Ile	Phe	Ser	Leu	Pro	Ile	Thr	Ile	Lys	Lys	Ile
	465					470					475					480
30	Lys	Leu	Ile	Lys	Glu	Glu	Ile	Ser	Ala	Leu	Asp	Glu	Asn	Ile	Pro	Lys
					485					490					495	
35	Asp	Arg	Gly	Leu	Ile	Val	Val	Asn	Ser	Pro	Lys	Lys	Pro	Val	Glu	Arg
				500					505					510		
40	Lys	Ser	Leu	Thr	Thr	Asp	Lys	Ile	Thr	Val	Gly	Phe	Glu	Glu	Glu	Thr
			515					520					525			
45	Asn	Leu	Ile	Leu	Arg	Lys	Leu	Thr	Ser	Gly	Ser	Ala	Asp	Leu	Asp	Val
		530					535					540				
50	Ile	Ser	Ile	Thr	Gly	Met	Pro	Gly	Ser	Gly	Lys	Thr	Thr	Leu	Ala	Tyr
	545					550					555					560
55	Lys	Val	Tyr	Asn	Asp	Lys	Ser	Val	Ser	Ser	Arg	Phe	Asp	Leu	Arg	Ala
				565						570					575	
60	Trp	Cys	Thr	Val	Asp	Gln	Gly	Cys	Asp	Glu	Lys	Lys	Leu	Leu	Asn	Thr
				580					585					590		
65	Ile	Phe	Ser	Gln	Val	Ser	Asp	Ser	Asp	Ser	Lys	Leu	Ser	Glu	Asn	Ile
			595					600					605			
70	Asp	Val	Ala	Asp	Lys	Leu	Arg	Lys	Gln	Leu	Phe	Gly	Lys	Arg	Tyr	Leu
		610					615					620				
75	Ile	Val	Leu	Asp	Asp	Val	Trp	Asp	Thr	Thr	Thr	Trp	Asp	Glu	Leu	Thr
	625					630					635					640
80	Arg	Pro	Phe	Pro	Glu	Ser	Lys	Lys	Gly	Ser	Arg	Ile	Ile	Leu	Thr	Thr
				645						650					655	
85	Arg	Glu	Lys	Glu	Val	Ala	Leu	His	Gly	Lys	Leu	Asn	Thr	Asp	Pro	Leu

	660	665	670
5	Asp Leu Arg 675	Leu Leu Arg Pro Asp Glu Ser Trp 680	Glu Leu Leu Glu Lys 685
10	Arg Ala Phe Gly Asn Glu 690	Ser Cys Pro Asp Glu 695	Leu Leu Asp Val Gly 700
15	Lys Glu Ile Ala Glu 705	Asn Cys Lys Gly Leu 710	Pro Leu Val Ala Asp Leu 715 720
20	Ile Ala Gly Val 725	Ile Ala Gly Arg Glu Lys Lys Arg 730	Ser Val Trp Leu 735
25	Glu Val Gln Ser 740	Ser Ser Phe Ile Leu Asn Ser 745	Glu Val Glu 750
30	Val Met Lys Val 755	Ile Glu Leu Ser Tyr Asp His Leu 760	Pro His His Leu 765
35	Lys Pro Cys Leu Leu Tyr 770	Phe Ala Ser Phe Pro Lys Asp Thr Ser Leu 775	
40	Thr Ile Tyr Glu Leu Asn Val Tyr Phe Gly 785	Ala Glu Gly Phe Val Gly 790 795	
45	Lys Thr Glu Met 805	Asn Ser Met Glu Glu Val Val Lys Ile Tyr Met Asp 810 815	
50	Asp Leu Ile Tyr 820	Ser Ser Leu Val Ile Cys Phe Asn Glu Ile Gly Tyr 825 830	
55	Ala Leu Asn Phe Gln Ile His Asp Leu Val His Asp Phe Cys Leu Ile 835 840 845		
60	Lys Ala Arg Lys Glu Asn Leu Phe Asp Gln Ile Arg Ser Ser Ala Pro 850 855 860		
65	Ser Asp Leu Leu Pro Arg Gln Ile Thr Ile Asp Cys Asp Glu Glu Glu 865 870 875 880		
70	His Phe Gly Leu Asn Phe Val Met Phe Asp Ser Asn Lys Lys Arg His 885 890 895		
75	Ser Gly Lys His Leu Tyr Ser Leu Arg Ile Ile Gly Asp Gln Leu Asp 900 905 910		
80	Asp Ser Val Ser Asp Ala Phe His Leu Arg His Leu Arg Leu Leu Arg 915 920 925		
85	Val Leu Asp Leu His Thr Ser Phe Ile Met Val Lys Asp Ser Leu Leu		

	930	935	940
5	Asn Glu Ile Cys Met Leu Asn His Leu Arg Tyr Leu Ser Ile Asp Thr 945 950 955 960		
10	Gln Val Lys Tyr Leu Pro Leu Ser Phe Ser Asn Leu Trp Asn Leu Glu 965 970 975		
15	Ser Leu Phe Val Ser Thr Asn Arg Ser Ile Leu Val Leu Leu Pro Arg 980 985 990		
20	Ile Leu Asp Leu Val Lys Leu Arg Val Leu Ser Val Asp Ala Cys Ser 995 1000 1005		
25	Phe Phe Asp Met Asp Ala Asp Glu Ser Ile Leu Ile Ala Glu Asp 1010 1015 1020		
30	Thr Lys Leu Glu Asn Leu Arg Ile Leu Thr Glu Leu Leu Ile Ser 1025 1030 1035		
35	Tyr Ser Lys Asp Thr Lys Asn Ile Phe Lys Arg Phe Pro Asn Leu 1040 1045 1050		
40	Gln Leu Leu Ser Phe Glu Leu Lys Glu Ser Trp Asp Tyr Ser Thr 1055 1060 1065		
45	Glu Gln His Trp Phe Ser Glu Leu Asp Phe Leu Thr Glu Leu Glu 1070 1075 1080		
50	Thr Leu Ser Val Gly Phe Lys Ser Ser Asn Thr Asn Asp Ser Gly 1085 1090 1095		
55	Ser Ser Val Ala Thr Asn Arg Pro Trp Asp Phe His Phe Pro Ser 1100 1105 1110		
60	Asn Leu Lys Ile Leu Trp Leu Arg Glu Phe Pro Leu Thr Ser Asp 1115 1120 1125		
65	Ser Leu Ser Thr Ile Ala Arg Leu Pro Asn Leu Glu Glu Leu Ser 1130 1135 1140		
70	Leu Tyr His Thr Ile Ile His Gly Glu Glu Trp Asn Met Gly Glu 1145 1150 1155		
75	Glu Asp Thr Phe Glu Asn Leu Lys Phe Leu Asn Phe Asn Gln Val 1160 1165 1170		
80	Ser Ile Ser Lys Trp Glu Val Gly Glu Glu Ser Phe Pro Asn Leu 1175 1180 1185		
85	Glu Lys Leu Lys Leu Arg Gly Cys His Lys Leu Glu Glu Ile Pro		

## 39

	1190	1195	1200	
5	Pro Ser Phe Gly Asp Ile Tyr Ser Leu Lys Ser Ile Lys Ile Val 1205 1210 1215			
10	Lys Ser Pro Gln Leu Glu Asp Ser Ala Leu Lys Ile Lys Glu Tyr 1220 1225 1230			
15	Ala Glu Asp Met Arg Gly Gly Asp Glu Leu Gln Ile Leu Gly Gln 1235 1240 1245			
20	Lys Asn Ile Pro Leu Phe Lys 1250 1255			
25	<210> 9 <211> 3774 <212> DNA <213> Lycopersicon lycopersicum			
30	<220> <221> CDS <222> (1)..(3774) <223> Mil.2 from tomato			
40	<400> 9 atg gaa aaa cga aaa gat att gaa gaa gca aac aac tca ttg gtg tta Met Glu Lys Arg Lys Asp Ile Glu Glu Ala Asn Asn Ser Leu Val Leu 1 5 10 15			48
45	ttt tct gct ctt agc aag gac att gcc aat gtt cta att ttc cta gag Phe Ser Ala Leu Ser Lys Asp Ile Ala Asn Val Leu Ile Phe Leu Glu 20 25 30			96
50	aat gag gaa aat caa aaa gct ctt gac aaa gat caa gtt gaa aag cta Asn Glu Glu Asn Gln Lys Ala Leu Asp Lys Asp Gln Val Glu Lys Leu 35 40 45			144
55	aaa ttg aaa atg gca ttt att tgt aca tat gtt cag ctt tct tat tcc Lys Leu Lys Met Ala Phe Ile Cys Thr Tyr Val Gln Leu Ser Tyr Ser 50 55 60			192
60	gat ttt gag cag ttt gaa gat ata atg act aga aat aga caa gag gtt Asp Phe Glu Gln Phe Glu Asp Ile Met Thr Arg Asn Arg Gln Glu Val 65 70 75 80			240
65	gag aat ctg ctt caa tca ctt ttg gat gat gat gtc ctt act agc ctc Glu Asn Leu Leu Gln Ser Leu Leu Asp Asp Asp Val Leu Thr Ser Leu 85 90 95			288
65	acc agt aat atg gat gac tgt atc agc ttg tat cat cgt tct tat aaa Thr Ser Asn Met Asp Asp Cys Ile Ser Leu Tyr His Arg Ser Tyr Lys 100 105 110			336

## 40

	tca gat gcc atc atg atg gat gag caa ttg gac ttc ctc ctc ttg aat	384
	Ser Asp Ala Ile Met Met Asp Glu Gln Leu Asp Phe Leu Leu Leu Asn	
	115 120 125	
5	ctg tat cat cta tcc aag cat cac gct gaa aag ata ttt cct gga gtg	432
	Leu Tyr His Leu Ser Lys His His Ala Glu Lys Ile Phe Pro Gly Val	
	130 135 140	
10	act caa tat gaa gtt ctt cag aat gta tgt ggc aac ata aga gat ttc	480
	Thr Gln Tyr Glu Val Leu Gln Asn Val Cys Gly Asn Ile Arg Asp Phe	
	145 150 155 160	
15	cat ggg ttg ata ctg aat ggt tgc att aag cat gag atg gtt gag aat	528
	His Gly Leu Ile Leu Asn Gly Cys Ile Lys His Glu Met Val Glu Asn	
	165 170 175	
20	gtc tta cct ctg ttt caa ctc atg gct gaa aga gta gga cac ttc ctt	576
	Val Leu Pro Leu Phe Gln Leu Met Ala Glu Arg Val Gly His Phe Leu	
	180 185 190	
25	tgg gag gat cag act gat gaa gac tct cgg ctc tcc gag cta gat gag	624
	Trp Glu Asp Gln Thr Asp Glu Asp Ser Arg Leu Ser Glu Leu Asp Glu	
	195 200 205	
30	gat gaa cac aat gat aga gac tct cga ctc ttc cag cta aca cat cta	672
	Asp Glu His Asn Asp Arg Asp Ser Arg Leu Phe Gln Leu Thr His Leu	
	210 215 220	
35	ctc ttg aag att gtt cca act gaa ctg gag gtt atg cac ata tgt tat	720
	Leu Leu Lys Ile Val Pro Thr Glu Leu Glu Val Met His Ile Cys Tyr	
	225 230 235 240	
40	aca aat ttg aaa gct tca act tca gca gaa gtt gga cgc ttc att aag	768
	Thr Asn Leu Lys Ala Ser Thr Ser Ala Glu Val Gly Arg Phe Ile Lys	
	245 250 255	
45	aag ctc ctg gaa acc tca ccg gat att ctc aga gaa tat atc att caa	816
	Lys Leu Leu Glu Thr Ser Pro Asp Ile Leu Arg Glu Tyr Ile Ile Gln	
	260 265 270	
50	cta caa gag cat atg tta act gtt att ccc cct agc act tta ggg gct	864
	Leu Gln Glu His Met Leu Thr Val Ile Pro Pro Ser Thr Leu Gly Ala	
	275 280 285	
55	cga aac att cat gtc atg atg gaa ttc cta tta ctt att ctt tct gat	912
	Arg Asn Ile His Val Met Met Glu Phe Leu Leu Leu Ile Leu Ser Asp	
	290 295 300	
60	atg ccc aag gac ttt att cat cat gac aaa ctt ttt gat ctc ttg gct	960
	Met Pro Lys Asp Phe Ile His His Asp Lys Leu Phe Asp Leu Leu Ala	
	305 310 315 320	
65	cat gtt gga aca ctt acc agg gag gta tcg act ctt gta cgt gac ttg	1008
	His Val Gly Thr Leu Thr Arg Glu Val Ser Thr Leu Val Arg Asp Leu	
	325 330 335	
70	gaa gag aaa tta agg aat aaa gag ggt aat aac caa aca aat tgt gca	1056
	Glu Glu Lys Leu Arg Asn Lys Glu Gly Asn Asn Gln Thr Asn Cys Ala	
	340 345 350	
75	acc cta gac ttg ctg gaa aat att gaa ctc ctc aag aaa gat ctc aaa	1104
	Thr Leu Asp Leu Leu Glu Asn Ile Glu Leu Leu Lys Lys Asp Leu Lys	
	355 360 365	
80	cat gtt tat ctg aaa gcc cca aat tca tct caa tgt tgc ttc ccc atg	1152
	His Val Tyr Leu Lys Ala Pro Asn Ser Ser Gln Cys Cys Phe Pro Met	
	370 375 380	

## 41

	agt gat gga cca ctc ttc atg cat ctt cta cac atg cac tta aat gat	1200
	Ser Asp Gly Pro Leu Phe Met His Leu Leu His Met His Leu Asn Asp	
	385 390 395 400	
5	ttg cta gat tct aat gct tat tca att tct ttg ata aag gaa gaa atc	1248
	Leu Leu Asp Ser Asn Ala Tyr Ser Ile Ser Leu Ile Lys Glu Glu Ile	
	405 410 415	
10	gag ttg gtg agt caa gaa ctg gaa ttc ata aga tca ttc ttt ggg gat	1296
	Glu Leu Val Ser Gln Glu Leu Glu Phe Ile Arg Ser Phe Phe Gly Asp	
	420 425 430	
15	gct gct gag caa gga ttg tat aaa gat atc tgg gca cgt gtt cta gat	1344
	Ala Ala Glu Gln Gly Leu Tyr Lys Asp Ile Trp Ala Arg Val Leu Asp	
	435 440 445	
20	gtg gct tat gag gca aaa gat gtc ata gat tca att att gtt cga gat	1392
	Val Ala Tyr Glu Ala Lys Asp Val Ile Asp Ser Ile Ile Val Arg Asp	
	450 455 460	
	aat ggt ctc tta cat ctt att ttc tca ctt ccc att acc ata aag aag	1440
	Asn Gly Leu Leu His Leu Ile Phe Ser Leu Pro Ile Thr Ile Lys Lys	
	465 470 475 480	
25	atc aaa ctt atc aaa gaa gag atc tct gct tta gat gag aac att ccc	1488
	Ile Lys Leu Ile Lys Glu Glu Ile Ser Ala Leu Asp Glu Asn Ile Pro	
	485 490 495	
30	aag gac aga ggt cta atc gtt gtg aac tct ccc aag aaa cca gtt gag	1536
	Lys Asp Arg Gly Leu Ile Val Val Asn Ser Pro Lys Lys Pro Val Glu	
	500 505 510	
35	aga aag tca ttg aca act gat aaa ata att gta ggt ttt gag gag gag	1584
	Arg Lys Ser Leu Thr Thr Asp Lys Ile Ile Val Gly Phe Glu Glu Glu	
	515 520 525	
40	aca aac ttg ata ctt aga aag ctc acc agt gga ccc gca gat tta gat	1632
	Thr Asn Leu Ile Leu Arg Lys Leu Thr Ser Gly Pro Ala Asp Leu Asp	
	530 535 540	
	gtc att tcg atc acc ggt atg ccg ggt tca ggt aaa act act ttg gca	1680
	Val Ile Ser Ile Thr Gly Met Pro Gly Ser Gly Lys Thr Thr Leu Ala	
	545 550 555 560	
45	tac aaa gta tac aat gat aag tca gtt tct aga cat ttt gac ctt cgt	1728
	Tyr Lys Val Tyr Asn Asp Lys Ser Val Ser Arg His Phe Asp Leu Arg	
	565 570 575	
50	gca tgg tgc acg gtc gat caa gga tat gac gac aag aag ttg ttg gat	1776
	Ala Trp Cys Thr Val Asp Gln Gly Tyr Asp Asp Lys Lys Leu Leu Asp	
	580 585 590	
55	aca att ttc agt caa gtt agt ggc tca gat tca aat ttg agt gag aat	1824
	Thr Ile Phe Ser Gln Val Ser Gly Ser Asp Ser Asn Leu Ser Glu Asn	
	595 600 605	
60	att gat gtt gct gat aaa ttg cgg aaa caa ctg ttt gga aag agg tat	1872
	Ile Asp Val Ala Asp Lys Leu Arg Lys Gln Leu Phe Gly Lys Arg Tyr	
	610 615 620	
	ctt att gtc tta gat gat gtg tgg gat act act aca ttg gat gag ttg	1920
	Leu Ile Val Leu Asp Asp Val Trp Asp Thr Thr Thr Leu Asp Glu Leu	
	625 630 635 640	
65	aca aga cct ttt cct gaa gct aag aaa gga agt agg att att ttg aca	1968
	Thr Arg Pro Phe Pro Glu Ala Lys Lys Gly Ser Arg Ile Ile Leu Thr	
	645 650 655	

	act cga gaa aag gaa gtg gct ttg cat gga aag ctg aac act gat cct	2016
	Thr Arg Glu Lys Glu Val Ala Leu His Gly Lys Leu Asn Thr Asp Pro	
	660 665 670	
5	ctt gac ctt cga ttg cta aga cca gat gaa agt tgg gaa ctt tta gat	2064
	Leu Asp Leu Arg Leu Leu Arg Pro Asp Glu Ser Trp Glu Leu Leu Asp	
	675 680 685	
10	aaa agg aca ttt ggt aat gag agt tgc cct gat gaa cta tta gat gtc	2112
	Lys Arg Thr Phe Gly Asn Glu Ser Cys Pro Asp Glu Leu Leu Asp Val	
	690 695 700	
15	ggt aaa gaa ata gcc gaa aat tgt aaa ggg ctt cct ttg gtg gct gat	2160
	Gly Lys Glu Ile Ala Glu Asn Cys Lys Gly Leu Pro Leu Val Ala Asp	
	705 710 715 720	
20	ctg att gct gga gtc att gct ggg agg gaa aag aaa agg agt gtg tgg	2208
	Leu Ile Ala Gly Val Ile Ala Gly Arg Glu Lys Lys Arg Ser Val Trp	
	725 730 735	
25	ctt gaa gtt caa agt agt ttg agt tct ttt att ttg aac agt gaa gtg	2256
	Leu Glu Val Gln Ser Ser Leu Ser Ser Phe Ile Leu Asn Ser Glu Val	
	740 745 750	
30	gaa gtg atg aaa gtt ata gaa tta agt tat gac cat tta cca cat cac	2304
	Glu Val Met Lys Val Ile Glu Leu Ser Tyr Asp His Leu Pro His His	
	755 760 765	
35	ctc aag cca tgc ttg ctt cac ttt gca agt tgg ccg aag gac act cct	2352
	Leu Lys Pro Cys Leu Leu His Phe Ala Ser Trp Pro Lys Asp Thr Pro	
	770 775 780	
40	ttg aca atc tat ttg ttt act gtt tat ttg ggt gct gaa gga ttt gtg	2400
	Leu Thr Ile Tyr Leu Phe Thr Val Tyr Leu Gly Ala Glu Gly Phe Val	
	785 790 795 800	
45	gaa aag acg gag atg aag ggt ata gaa gaa gtg gtg aag att tat atg	2448
	Glu Lys Thr Glu Met Lys Gly Ile Glu Glu Val Val Lys Ile Tyr Met	
	805 810 815	
50	gat gat tta att tcc agt agc ttg gta att tgt ttc aat gag ata ggt	2496
	Asp Asp Leu Ile Ser Ser Ser Leu Val Ile Cys Phe Asn Glu Ile Gly	
	820 825 830	
55	gat ata ctg aat ttc caa att cat gat ctt gtg cat gac ttt tgt ttg	2544
	Asp Ile Leu Asn Phe Gln Ile His Asp Leu Val His Asp Phe Cys Leu	
	835 840 845	
60	ata aaa gca aga aag gaa aat ttg ttt gat cgg ata aga tca agt gct	2592
	Ile Lys Ala Arg Lys Glu Asn Leu Phe Asp Arg Ile Arg Ser Ser Ala	
	850 855 860	
65	cca tca gat ttg ttg cct cgt caa att acc att gat tat gat gag gag	2640
	Pro Ser Asp Leu Leu Pro Arg Gln Ile Thr Ile Asp Tyr Asp Glu Glu	
	865 870 875 880	
70	gag gag cac ttt ggg ctt aat ttt gtc atg ttc gat tca aat aag aaa	2688
	Glu Glu His Phe Gly Leu Asn Phe Val Met Phe Asp Ser Asn Lys Lys	
	885 890 895	
75	agg cat tct ggt aaa cac ctc tat tct ttg agg ata aat gga gac cag	2736
	Arg His Ser Gly Lys His Leu Tyr Ser Leu Arg Ile Asn Gly Asp Gln	
	900 905 910	
80	ctg gat gac agt gtt tct gat gca ttt cac cta aga cac ttg agg ctt	2784
	Leu Asp Asp Ser Val Ser Asp Ala Phe His Leu Arg His Leu Arg Leu	
	915 920 925	

## 43

	att aga gtg ttg gac ctg gaa ccc tct tta atc atg gtg aat gat tct	2832
	Ile Arg Val Leu Asp Leu Glu Pro Ser Leu Ile Met Val Asn Asp Ser	
	930 935 940	
5	ttg ctg aat gaa ata tgc atg ttg aat cat ttg agg tac tta aga att	2880
	Leu Leu Asn Glu Ile Cys Met Leu Asn His Leu Arg Tyr Leu Arg Ile	
	945 950 955 960	
10	cgg aca caa gtt aaa tat ctg cct ttc tct ttc tca aac ctc tgg aat	2928
	Arg Thr Gln Val Lys Tyr Leu Pro Phe Ser Phe Ser Asn Leu Trp Asn	
	965 970 975	
15	cta gaa agt ctg ttt gtg tct aac aaa gga tca atc ttg gta cta tta	2976
	Leu Glu Ser Leu Phe Val Ser Asn Lys Gly Ser Ile Leu Val Leu Leu	
	980 985 990	
20	ccg aga att ttg gat ctt gta aag ttg cga gtg ctg tcc gtg ggt gct	3024
	Pro Arg Ile Leu Asp Leu Val Lys Leu Arg Val Leu Ser Val Gly Ala	
	995 1000 1005	
	tgt tct ttc ttt gat atg gat gca gat gaa tca ata ttg ata gca	3069
	Cys Ser Phe Phe Asp Met Asp Ala Asp Glu Ser Ile Leu Ile Ala	
	1010 1015 1020	
25	aag gac aca aag tta gag aac ttg aga ata tta ggg gaa ctg ttg	3114
	Lys Asp Thr Lys Leu Glu Asn Leu Arg Ile Leu Gly Glu Leu Leu	
	1025 1030 1035	
30	att tcc tat tcy aaa gat aca atg aat att ttc aaa agg ttt ccc	3159
	Ile Ser Tyr Ser Lys Asp Thr Met Asn Ile Phe Lys Arg Phe Pro	
	1040 1045 1050	
35	aat ctt cag gtg ctt cag ttt gaa ctc aag gag tca tgg gat tat	3204
	Asn Leu Gln Val Leu Gln Phe Glu Leu Lys Glu Ser Trp Asp Tyr	
	1055 1060 1065	
40	tca aca gag caa cat tgg ttc ccg aaa ttg gat tgc cta act gaa	3249
	Ser Thr Glu Gln His Trp Phe Pro Lys Leu Asp Cys Leu Thr Glu	
	1070 1075 1080	
	cta gaa aca ctc tgt gta ggt ttt aaa agt tca aac aca aac cac	3294
	Leu Glu Thr Leu Cys Val Gly Phe Lys Ser Ser Asn Thr Asn His	
	1085 1090 1095	
45	tgt ggg tcc tct gtt gtg aca aat cgg ccg tgg gat ttt cac ttc	3339
	Cys Gly Ser Ser Val Val Thr Asn Arg Pro Trp Asp Phe His Phe	
	1100 1105 1110	
50	cct tca aat ttg aaa gaa ctg ttg ttg tat gac ttt cct ctg aca	3384
	Pro Ser Asn Leu Lys Glu Leu Leu Leu Tyr Asp Phe Pro Leu Thr	
	1115 1120 1125	
55	tcc gat tca cta tca aca ata gcg aga ctg ccc aac ctt gaa aat	3429
	Ser Asp Ser Leu Ser Thr Ile Ala Arg Leu Pro Asn Leu Glu Asn	
	1130 1135 1140	
60	ttg tcc ctt tat gat aca atc atc cag gga gaa gaa tgg aac atg	3474
	Leu Ser Leu Tyr Asp Thr Ile Ile Gln Gly Glu Glu Trp Asn Met	
	1145 1150 1155	
	ggg gag gaa gac act ttt gag aat ctc aaa ttt ttg aac ttg cgt	3519
	Gly Glu Glu Asp Thr Phe Glu Asn Leu Lys Phe Leu Asn Leu Arg	
	1160 1165 1170	
65	cta ctg act ctt tcc aag tgg gag gtt gga gag gaa tcc ttc ccc	3564
	Leu Leu Thr Leu Ser Lys Trp Glu Val Gly Glu Glu Ser Phe Pro	
	1175 1180 1185	

## 44

aat ctt gag aaa tta aaa ctg cag gaa tgt ggt aag ctt gag gag 3609  
 Asn Leu Glu Lys Leu Lys Leu Gln Glu Cys Gly Lys Leu Glu Glu  
 1190 1195 1200

5 att cca cct agt ttt gga gat att tat tca ttg aaa ttt atc aaa 3654  
 Ile Pro Pro Ser Phe Gly Asp Ile Tyr Ser Leu Lys Phe Ile Lys  
 1205 1210 1215

10 att gta aag agt cct caa ctt gaa gat tct gct ctc aag att aag 3699  
 Ile Val Lys Ser Pro Gln Leu Glu Asp Ser Ala Leu Lys Ile Lys  
 1220 1225 1230

15 aaa tac gct gaa gat atg aga gga ggg aac gat ctt cag atc ctt 3744  
 Lys Tyr Ala Glu Asp Met Arg Gly Gly Asn Asp Leu Gln Ile Leu  
 1235 1240 1245

ggc cag aag aat atc ccc tta ttt aag tag 3774  
 Gly Gln Lys Asn Ile Pro Leu Phe Lys  
 1250 1255

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 40 20 25 30  
 Asn Glu Glu Asn Gln Lys Ala Leu Asp Lys Asp Gln Val Glu Lys Leu  
 45 35 40 45  
 Lys Leu Lys Met Ala Phe Ile Cys Thr Tyr Val Gln Leu Ser Tyr Ser  
 50 50 55 60  
 Asp Phe Glu Gln Phe Glu Asp Ile Met Thr Arg Asn Arg Gln Glu Val  
 55 65 70 75 80  
 Glu Asn Leu Leu Gln Ser Leu Leu Asp Asp Asp Val Leu Thr Ser Leu  
 60 85 90 95  
 Thr Ser Asn Met Asp Asp Cys Ile Ser Leu Tyr His Arg Ser Tyr Lys  
 100 105 110  
 Ser Asp Ala Ile Met Met Asp Glu Gln Leu Asp Phe Leu Leu Leu Asn  
 115 120 125  
 65 Leu Tyr His Leu Ser Lys His His Ala Glu Lys Ile Phe Pro Gly Val  
 130 135 140

## 45

Thr Gln Tyr Glu Val Leu Gln Asn Val Cys Gly Asn Ile Arg Asp Phe  
 145 150 155 160  
 5 His Gly Leu Ile Leu Asn Gly Cys Ile Lys His Glu Met Val Glu Asn  
 165 170 175  
 10 Val Leu Pro Leu Phe Gln Leu Met Ala Glu Arg Val Gly His Phe Leu  
 180 185 190  
 15 Trp Glu Asp Gln Thr Asp Glu Asp Ser Arg Leu Ser Glu Leu Asp Glu  
 195 200 205  
 20 Asp Glu His Asn Asp Arg Asp Ser Arg Leu Phe Gln Leu Thr His Leu  
 210 215 220  
 Leu Leu Lys Ile Val Pro Thr Glu Leu Glu Val Met His Ile Cys Tyr  
 225 230 235 240  
 25 Thr Asn Leu Lys Ala Ser Thr Ser Ala Glu Val Gly Arg Phe Ile Lys  
 245 250 255  
 30 Lys Leu Leu Glu Thr Ser Pro Asp Ile Leu Arg Glu Tyr Ile Ile Gln  
 260 265 270  
 35 Leu Gln Glu His Met Leu Thr Val Ile Pro Pro Ser Thr Leu Gly Ala  
 275 280 285  
 40 Arg Asn Ile His Val Met Met Glu Phe Leu Leu Leu Ile Leu Ser Asp  
 290 295 300  
 Met Pro Lys Asp Phe Ile His His Asp Lys Leu Phe Asp Leu Leu Ala  
 305 310 315 320  
 45 His Val Gly Thr Leu Thr Arg Glu Val Ser Thr Leu Val Arg Asp Leu  
 325 330 335  
 50 Glu Glu Lys Leu Arg Asn Lys Glu Gly Asn Asn Gln Thr Asn Cys Ala  
 340 345 350  
 55 Thr Leu Asp Leu Leu Glu Asn Ile Glu Leu Leu Lys Lys Asp Leu Lys  
 355 360 365  
 60 His Val Tyr Leu Lys Ala Pro Asn Ser Ser Gln Cys Cys Phe Pro Met  
 370 375 380  
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	1 5 10 15		
55	ctc aaa ggg gaa ctt gta ttg ctt ttc ggt ttt caa gat gag ttc caa		96
	Leu Lys Gly Glu Leu Val Leu Leu Phe Gly Phe Gln Asp Glu Phe Gln		
	20 25 30		
60	agg ctt tca agc atg ttt tct aca att caa gcc gtc ctt gaa gat gct		144
	Arg Leu Ser Ser Met Phe Ser Thr Ile Gln Ala Val Leu Glu Asp Ala		
	35 40 45		
65	cag gag aag caa ctc aac aac aag cct cta gaa aat tgg ttg caa aaa		192
	Gln Glu Lys Gln Leu Asn Asn Lys Pro Leu Glu Asn Trp Leu Gln Lys		
	50 55 60		
	ctc aat gct gct aca tat gaa gtc gat gac atc ttg gat gaa tat aaa		240
	Leu Asn Ala Ala Thr Tyr Glu Val Asp Asp Ile Leu Asp Glu Tyr Lys		

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10	aag gtt atc cct ttc cgt cac aag gtc ggg aaa agg atg gac caa gtg Lys Val Ile Pro Phe Arg His Lys Val Gly Lys Arg Met Asp Gln Val	100	105	110	336
15	atg aaa aaa cta aag gca att gct gag gaa aga aag aat ttt cat ttg Met Lys Lys Leu Lys Ala Ile Ala Glu Glu Arg Lys Asn Phe His Leu	115	120	125	384
20	cac gaa aaa att gta gag aga caa gct gtt aga cgg gaa aca ggt tct His Glu Lys Ile Val Glu Arg Gln Ala Val Arg Arg Glu Thr Gly Ser	130	135	140	432
25	gta tta acc gaa ccg cag gtt tat gga aga gac aaa gag aaa gat gag Val Leu Thr Glu Pro Gln Val Tyr Gly Arg Asp Lys Glu Lys Asp Glu	145	150	155	480
30	ata gtg aaa atc cta ata aac aat gtt agt gat gcc caa cac ctt tca Ile Val Lys Ile Leu Ile Asn Asn Val Ser Asp Ala Gln His Leu Ser	165	170	175	528
35	gtc ctc cca ata ctt ggt atg ggg gga tta gga aaa acg act ctt gcc Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu Ala	180	185	190	576
40	caa atg gtc ttc aat gac cag aga gtt act gag cat ttc cat tcc aaa Gln Met Val Phe Asn Asp Gln Arg Val Thr Glu His Phe His Ser Lys	195	200	205	624
45	ata tgg att tgt gtc tcg gaa gat ttt gat gag aag agg tta ata aag Ile Trp Ile Cys Val Ser Glu Asp Phe Asp Glu Lys Arg Leu Ile Lys	210	215	220	672
50	gca att gta gaa tct att gaa gga agg cca cta ctt ggt gag atg gac Ala Ile Val Glu Ser Ile Glu Gly Arg Pro Leu Leu Gly Glu Met Asp	225	230	235	720
55	ttg gct cca ctt caa aag aag ctt cag gag ttg ctg aat gga aaa aga Leu Ala Pro Leu Gln Lys Lys Leu Gln Glu Leu Leu Asn Gly Lys Arg	245	250	255	768
60	tac ttg ctt gtc tta gat gat gtt tgg aat gaa gat caa cag aag tgg Tyr Leu Leu Val Leu Asp Asp Val Trp Asn Glu Asp Gln Gln Lys Trp	260	265	270	816
65	gct aat tta aga gca gtc ttg aag gtt gga gca agt ggt gct tct gtt Ala Asn Leu Arg Ala Val Leu Lys Val Gly Ala Ser Gly Ala Ser Val	275	280	285	864
	cta acc act act cgt ctt gaa aag gtt gga tca att atg gga aca ttg Leu Thr Thr Thr Arg Leu Glu Lys Val Gly Ser Ile Met Gly Thr Leu	290	295	300	912
	caa cca tat gaa ctg tca aat ctg tct caa gaa gat tgt tgg ttg ttg Gln Pro Tyr Glu Leu Ser Asn Leu Ser Gln Glu Asp Cys Trp Leu Leu	305	310	315	960
	ttc atg caa cgt gca ttt gga cac caa gaa gaa ata aat cca aac ctt Phe Met Gln Arg Ala Phe Gly His Gln Glu Glu Ile Asn Pro Asn Leu	325	330	335	1008
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10	gca tgg gaa cat gtg aga gac agt ccg att tgg aat ttg cct caa gat Ala Trp Glu His Val Arg Asp Ser Pro Ile Trp Asn Leu Pro Gln Asp 370 375 380	1152		
15	gaa agt tct att ctg cct gcc ctg agg ctt agt tac cat caa ctt cca Glu Ser Ser Ile Leu Pro Ala Leu Arg Leu Ser Tyr His Gln Leu Pro 385 390 395 400	1200		
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35	gta tgg aaa gaa tta tac ttg agg tct ttt ttc caa gag att gaa gtt Val Trp Lys Glu Leu Tyr Phe Arg Ser Phe Phe Gln Glu Ile Glu Val 450 455 460	1392		
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45	gca aca tct ctg ttt tca gca aac aca tca agc agc aat atc cgt gaa Ala Thr Ser Leu Phe Ser Ala Asn Thr Ser Ser Ser Asn Ile Arg Glu 485 490 495	1488		
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75	ctt gat cta caa tat tgc acc aag ctt tgt tgt ttg cca aaa gaa aca Leu Asp Leu Gln Tyr Cys Thr Lys Leu Cys Cys Leu Pro Lys Glu Thr 580 585 590	1776		
80	agt aaa ctt ggt agt ctc cga aat ctt tta ctt gat ggt agc cag tca Ser Lys Leu Gly Ser Leu Arg Asn Leu Leu Leu Asp Gly Ser Gln Ser 595 600 605	1824		
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10	cta gga aac cta aat ctc tat ggc tca att aaa atc tcg cat ctt gag Leu Gly Asn Leu Asn Leu Tyr Gly Ser Ile Lys Ile Ser His Leu Glu 645 650 655	1968		
15	aga gtg aag aat gat aag gac gca aaa gaa gcc aat tta tct gca aaa Arg Val Lys Asn Asp Lys Asp Ala Lys Glu Ala Asn Leu Ser Ala Lys 660 665 670	2016		
20	ggg aat ctg cat tct tta agc atg agt tgg aat aac ttt gga cca cat Gly Asn Leu His Ser Leu Ser Met Ser Trp Asn Asn Phe Gly Pro His 675 680 685	2064		
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35	cca gag tgg atg aat cac tca gta ttg aaa aat att gtc tct att cta Pro Glu Trp Met Asn His Ser Val Leu Lys Asn Ile Val Ser Ile Leu 725 730 735	2208		
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82

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15	cag cac cta aca acc ctc aca agt tta aaa att cgg gga tgt cca caa Gln His Leu Thr Thr Leu Thr Ser Leu Lys Ile Arg Gly Cys Pro Gln 930 935 940	2832		
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	His Glu Lys Ile Val Glu Arg Gln Ala Val Arg Arg Glu Thr Gly Ser			

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45	Ala	Asn	Leu	Arg	Ala	Val	Leu	Lys	Val	Gly	Ala	Ser	Gly	Ala	Ser	Val 285
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85	Leu	Asp	Leu	Lys	Gln	Cys	Phe	Ala	Tyr	Cys	Ala	Val	Phe	Pro	Lys	Asp

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10	Phe Leu Leu Ser Lys Gly Asn Met Glu Leu Glu Asp Val Gly Asp Glu		
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15	Val Trp Lys Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val		
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40	Arg Val Leu Asn Leu Gly Asp Ser Thr Phe Asn Lys Leu Pro Ser Ser		
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65	Leu Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr		
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75	Leu Gly Asn Leu Asn Leu Tyr Gly Ser Ile Lys Ile Ser His Leu Glu		
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10	Ser Asn Leu Thr Ser Leu Lys Ile Tyr Gly Phe Arg Gly Ile His Leu 705 710 715 720		
	Pro Glu Trp Met Asn His Ser Val Leu Lys Asn Ile Val Ser Ile Leu 725 730 735		
15	Ile Ser Asn Phe Arg Asn Cys Ser Cys Leu Pro Pro Phe Gly Asp Leu 740 745 750		
20	Pro Cys Leu Glu Ser Leu Glu Leu His Trp Gly Ser Ala Asp Val Glu 755 760 765		
25	Tyr Val Glu Glu Val Asp Ile Asp Val His Ser Gly Phe Pro Thr Arg 770 775 780		
30	Ile Arg Phe Pro Ser Leu Arg Lys Leu Asp Ile Trp Asp Phe Gly Ser 785 790 795 800		
	Leu Lys Gly Leu Leu Lys Lys Glu Gly Glu Glu Gln Phe Pro Val Leu 805 810 815		
35	Glu Glu Met Ile Ile His Glu Cys Pro Phe Leu Thr Leu Ser Ser Asn 820 825 830		
40	Leu Arg Ala Leu Thr Ser Leu Arg Ile Cys Tyr Asn Lys Val Ala Thr 835 840 845		
45	Ser Phe Pro Glu Glu Met Phe Lys Asn Leu Ala Asn Leu Lys Tyr Leu 850 855 860		
50	Thr Ile Ser Arg Cys Asn Asn Leu Lys Glu Leu Pro Thr Ser Leu Ala 865 870 875 880		
	Ser Leu Asn Ala Leu Lys Ser Leu Lys Ile Gln Leu Cys Cys Ala Leu 885 890 895		
55	Glu Ser Leu Pro Glu Glu Gly Leu Glu Gly Leu Ser Ser Leu Thr Glu 900 905 910		
60	Leu Phe Val Glu His Cys Asn Met Leu Lys Cys Leu Pro Glu Gly Leu 915 920 925		
65	Gln His Leu Thr Thr Leu Thr Ser Leu Lys Ile Arg Gly Cys Pro Gln 930 935 940		
	Leu Ile Lys Arg Cys Glu Lys Gly Ile Gly Glu Asp Trp His Lys Ile		

86

945

950

955

960

5 Ser His Ile Pro Asn Val Asn Ile Tyr Ile  
965 970